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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/613,456

Applicant(s)

SATO ET AL.

Examiner

Walter F. Briney III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claims 21-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.**

Claims 21-39 contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding the product-by-process aspect of claim 21 first, it is noted that the diaphragm of the claimed loudspeaker is manufactured by (1) heating a molded resin speaker diaphragm and (2) activating the surface of said diaphragm by applying plasma while keeping the temperature inside a reactive chamber below a heat deformation temperature of said diaphragm.

The heating, as disclosed in the specification appears to be an ancillary effect of applying plasma. The key being that the heat never rises above the heat deformation point of the diaphragm. This implies, with respect to the diaphragm structure by which a product-by-process claim is interpreted, that the shape of the diaphragm before and

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after plasma activation is the same. However, to give weight to this implication, one of ordinary skill in the art must know what shape was given to the diaphragm to start with. This is neither given in the claim nor the specification, and thus, an adequate written description has not been provided. At most, figures 1 and 2 appear to illustrate a plurality of generally frusto-conical diaphragms 4, however, it is established that figures are not to be necessarily taken as drawn to scale. Therefore, the actual conical slope, ratio of inner and outer circumference and other critical diaphragm parameters are not defined. In being generous, one of ordinary skill could simply state that the limitation is broad, and that the process generally implies a non-deformed diaphragm. In this case, any diaphragm is applicable as prior art since there is no standard for measuring deformity—it is all relative.

The activation implies an increased wettability. However, the specification defines wettability in the units dynes/cm, whereas the art recognized units of wettability are degrees indicating the contact angle between a surface and a drop of liquid. Complicating this definition is the fact that several competing methods of wettability measurement are used, yielding different results. This evidences a lack of adequate written description since the wrong measurement is being communicated. Moreover, it is noted that measures including wetting tension and surface energy are functions of this angle and are given in the units dynes/cm. However, the wetting tension and surface energy are dependent on the liquid used in measurement, which is not disclosed along with the wettability measuring technique. Therefore, it is impossible to

determine a baseline for comparing the wettability of the output of the claimed process to the prior art.

2. **Claims 21-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claims 21-39 were shown above to either be unsupported by an adequate written description of the invention or fail to provide a baseline for determination when taken in conjunction with the specification. This failure to provide a baseline renders the claims indefinite.

Claim 26 is limited to "a loudspeaker according to claim 21," as covered by applicant's admitted prior art. This claim defines the wettability of the diaphragm in terms of dynes/cm, which is inappropriate. See the proceeding section entitled *Response to Arguments*. As a result it is impossible to determine the metes and bounds of the invention. For the purpose of this Office Action, this limitation will be treated as not further limiting on the diaphragm since applicant's intended meaning is unclear.

Claims 29, 31, 34, 36 and 39 are not patentably distinct from claim 26 *mutatis mutandis*, and are rejected for the same reasons.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. **Claims 21-25, 30 and 35 are rejected under 35 U.S.C. 102(a) as being anticipated by the applicant's admitted prior art (figures 4 and 7; specification pages 1-3 and 6).**

Claim 21 is limited to "a loudspeaker." Each of the elements of the claimed loudspeaker are anticipated by applicant's admitted prior art. See figure 7. The prior art loudspeaker includes a "magnetic circuit" 15a, a "frame" 16, a "diaphragm" 19 and a "voice coil" 18 all of which are arranged as claimed. The diaphragm is disclosed as a polyethylene resin. See page 2, lines 4-11. What is not clear from figure 7, is whether the diaphragm 19 is the same as the one manufactured by the process of claim 21. These limitations are treated below.

As noted in the 35 U.S.C. 112 rejections above it was shown that the process produces a diaphragm with no heat deformations. Granting that this is adequately supported in the specification, however, fails to provide a baseline diaphragm by which to measure the resulting shape. Therefore, a diaphragm of any shape anticipates this limitation.

As noted in the preceding 35 U.S.C. 112 rejections the plasma activation does increase wettability to roughly 44 dyn/cm. However, this measurement makes no sense. At most it can be said that the wetting tension or surface energy is increased to 44 dyn/cm, but since these measurements are test liquid dependent, and the liquid has not been disclosed, any diaphragm wettability anticipates this limitation. See applicant's specification page 6, line 25, through page 7, line 2.

Moreover, the admitted prior art states that the prior art activation process yields a wettability of 46 dyn/cm, however, only for a short time. While short lived, the wettability is roughly the same for some period of time. It is noted that if the wettability remains at 46 dyn/cm for a period long enough to test, it remains at 46 dyn/cm long enough to be used in forming an adhesive bond to a voice coil and speaker frame. See applicant's specification page 6, lines 21-24. Therefore, the applicant's admitted prior art anticipates all limitations of the claim.

Claim 22 is limited to "a loudspeaker" that is essentially the same as that recited in claim 21, and is rejected for the same reasons.

Claim 24 is limited to "a loudspeaker according to claim 21," as covered by the applicant's admitted prior art. The specification indicates on page 6, lines 14-17, that the use of the meshed metal frame increases uniformity of wettability. However, the prior art corona discharge method disclosed on page 2, lines 18-25, is said to achieve the same result with sufficiently large electrodes. Moreover, simply not treating any prior art diaphragm, but simply manufacturing one to specific dimension achieves uniform wettability. Therefore, the applicant's admitted prior art anticipates all limitations of the claim.

Claim 25 is limited to "a loudspeaker according to claim 21," as covered by applicant's admitted prior art. Applicant admits on page 1, lines 23-27, and page 2, lines 4-11, of a loudspeaker diaphragm made from "polyethylene resin." Therefore, Applicant's admitted prior art anticipates all limitations of the claim.

Claims 30 and 35 are not patentably distinct from claim 25 *mutatis mutandis*, and are rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 23, 27, 28, 32, 33, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art in view of Inoue (US Patent 4,351,411).**

Claim 23 is limited to "a loudspeaker according to claim 21," as covered by the applicant's admitted prior art. The method of diaphragm formation is not disclosed in the prior art section of the applicant's specification, it cannot be said that the prior art anticipates one of "injection molding and sheet forming," however, this deficiency is overcome by an obvious modification.

In particular, since the applicant's admitted prior art does not prescribe a particular forming method, the forming method cannot be said to be critical, so one of ordinary skill in the art would be inherently motivated to find any practical forming process amongst the known prior art. The loudspeaker art happens to be replete with references to injection molding used in forming diaphragms consisting of resins. For example, see the Abstract of Inoue (US Patent 4,351,411).

It would have been obvious to one of ordinary skill in the art to form the synthetic polyethylene resin of the applicant's admitted prior art into a diaphragm form using injection molding as taught by Inoue simply because the forming process was not critical to the applicant's admitted prior art.

Claims 27 and 28 are limited to "a loudspeaker according to claim 21," as covered by applicant's admitted prior art. These claims define further physical properties of the claimed diaphragm. While applicant's admitted prior art fails to disclose these properties, it is noted that the applicant fails to specify the necessity or function of these properties. It is presumed that choosing a polyethylene resin with different properties than the polyethylene resin disclosed in the prior art would result in the same functional diaphragm. In other words, applicant's choice is one of design choice.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to pick a different polyethylene resin with the same properties, since doing so would have been out of design choice.

Claims 32, 33, 37 and 38 are not patentably distinct from claims 27 and 28 *mutatis mutandis*, and are rejected for the same reasons.

Response to Arguments

Applicant's arguments filed 02 February 2007 have been fully considered but they are not persuasive.

Regarding the 35 USC 112, first paragraph, rejections of claims 21-24, the applicant makes several allegations concerning the heating, deformation temperature and wettability limitations of the claims. Concerning heating, applicant states that the source of heat is not relevant to the examination of the claim. The fact that the claim does not specify the source of heat means that the source is indeed irrelevant, but the examiner's statement was simply made as an introduction to later points.

Concerning the deformation temperature, the applicant states: "claim 21 does not recite, as the Office implies, that the shape of the diaphragm is unchanged;" moreover, "whether or not the diaphragm deforms during the process, the amount of deformation (if deformation occurs), and the lack of a method for measuring deformation are irrelevant to an understanding of the claim." In essence, applicant is admitting that the heating step is entirely irrelevant to the understanding of the claim. To see this, consider that keeping the temperature of the diaphragm below the heat deformation point is intended to prevent deformation (i.e., a change in the shape) of the diaphragm. Since the statutory class of the invention is a product-by-process, it is the product that protection is sought for. If deformation, which is prevented by the recited heating step, is irrelevant as the applicant suggests, then the shape of the product before and after heating is irrelevant, which means the heating step is irrelevant.

It is also noted that the applicant believes that the Office has inappropriately read limitations into the claim. However, in a product-by-process claim, the process used to make a claimed product defines the structure of said product. The unspoken physical transformations resulting from each process step must be read into the claim. In this

case, a diaphragm is heated below a heat deformation point. The only meaning this limitation can apparently take is that the diaphragm's shape/size is unchanged by heating. For this limitation to warrant any patentable weight, a shape for the diaphragm must be assumed. The lack of any disclosure describing the shape leads to one of two results, as posited in the preceding Office Action: (1) the written description is insufficient; or (2) the claim limitation has no weight. Applicant's latest remarks make it clear that the latter result is what was intended. In any case, the 35 USC 112, first paragraph, rejections will be maintained in order to show that the full scope of the claim is unpatentable.

Concerning wettability, applicant initially states that the Office failed to document that wettability is not defined by dynes/cm. This is like asking the Office to document that the units of force are mass times acceleration. The units of a physical property are known from the property itself. In any case, applicant asserts that the "use of 'dynes/cm' to measure wettability is well [known]." Applicant submits evidence of this outside of a declaration filed pursuant to Rule 37 CFR 1.132. This informality notwithstanding, applicant has inappropriately equivocated the terms "wetting tension" and "wettability." Wetting tension is the product of surface energy and a contact angle, or the difference between the gas-solid interface energy and the solid-liquid interface energy. In any case, wetting tension is not a fundamental property of a solid since it relies on both the type of gas and liquid used in measurement. This is evidenced by formula 1 of applicant's evidence. The term wettability is unfortunately not used; however, patent 4,946,903, cited by the applicant as further evidence of the use of

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dynes/cm as a measurement of wettability independently confirms what one of ordinary skill in the art knows wettability to be: "the contact angles of various liquids each having a different surface tension." In discussing table II, the '903 patent states: "Table II shows that a decrease in contact angles as measured on the 20 minute H.sub.2 /H.sub.2 O RFGD modified Goretex was small for the liquids having surface tensions >39.3 dyne/cm indicating a retention of the original materials non-wetting characteristics for these liquids. The measured angles for these liquids also indicate the retention of surface residing fluorine functionality and especially a large degree of hydrophobicity as indicated from the angles measured for water and glycerol. Below 39.3 dyne/cm, the contact angles of the utilized liquids showed a larger degree of wettability indicating an increase in surface energy which is ascribed to the presence of small amounts of surface residing oxygen functionality earlier detected by ESCA and IR results."

Patent 5,912,194 never actually equates dynes/cm with wettability, but instead equates dynes/cm with wetting tension. Patents 6,040,042 and 6,025,058 are notably held by the same assigned and were probably drafted by the same person. These patents link wettability to dynes/cm, but these links have been shown to be an inappropriate equivocation.

The applicant requests documentation that wettability cannot be expressed in dynes/cm. Despite the fact that wettability is a known physical property of a solid that is not related to force over distance, applicant's request has been fulfilled by the foregoing discussion of wettability. Applicant also requests documentation on how wettability can

be measured. The examiner respectfully declines, as it has already been thoroughly shown that wettability cannot be measured in dynes/cm.

Regarding the 35 USC 112, second paragraph, rejections, applicant's position that the amount of deformation is immaterial to examination is noted. Accordingly, the effect of heating on the claimed product is immaterial as shown in the foregoing.

Regarding the 35 USC 102 rejections, applicant alleges that because "wettability" is not in the claims, it does not matter whether the prior art teaches it or not. However, the very core of a product-by-process claim is to define the product by the claimed process. It is not simply whether the product or the process is known, but whether the product defined by the process or the process is known. Applicant's specification discloses that the claimed plasma activation step adjusts wettability. Much like the above argument concerning shape after heating, applicant's specification either is deficient in clearly defining the invention, or the claim limitation does not warrant patentable weight since understanding the effect of adjusting a product's wettability requires understanding of, at least, the ending wettability. Since the applicant inappropriately defines wettability in terms of dynes/cm, it is impossible to make this determination, hence the position that the claim "makes no sense."

The applicant notes on page 9 that a "'standing step' is not part of the claim"; however, the claims are constructed with the transitional phrase "comprising," which means the claimed process may include more steps that are not specifically excluded.

Regarding the 35 USC 103 rejections, the applicant simply recounts the arguments treated in the foregoing. Therefore, as all of the applicant's arguments have

been shown to be either unpersuasive or moot, the rejections of claims 21-25 are maintained.

In summary, the applicant has failed to overcome by argument the 35 USC 112, first and second paragraph, rejections as well as the 35 USC 102 and 35 USC 103 rejections. The 102, 103 and 112 rejections are hereby maintained to show that the full scope of the claims is unpatentable.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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